

the fruits are obovoid, 2-locular and dry. *Burroughsia appendiculata* is a relatively short plant, 1–1.5 dm tall, with pencil-thick, corky, horizontal rhizomes, rather strongly lobed leaves, uniform, antrorse, strigose stem vestiture accompanied by orange-glands and a distinct yellow corolla eye (Fig. 1). *Burroughsia fastigiata*, on the other hand, is usually a taller, twiggy plant, with smaller, more crowded, fewer-lobed leaves, and generally denser, more curved vestiture that is retrorse on stems, antrorse on leaves, with light yellowish to colorless glands and corollas that lack a yellow eye (see illustration in Wiggins' *Flora of Baja California*, p. 527, 1980). Several notes on the genus have been published by Moldenke (*Phytologia* 30:186–189, 1975; 40:423, 1978; 46:402, 1980) and these cite a number of additional references.

Routine study of the two species in connection with the Chihuahuan Desert flora, however, showed that *B. fastigiata* lacks the filament-like extensions on the distal anther connectives—the very character upon which the genus was erected. It is perhaps surprising that this error was not noticed for over 45 years, but the species is restricted to Baja California and is seldom collected. Moldenke (in Shreve and Wiggins, *Veget. Flora Sonoran Desert* 2:1246–1247, 1964) separated *Burroughsia* in the key on the basis of “anthers appendaged” but did not mention the structures in the species description, though it is noted in the generic description. Wiggins (*Fl. Baja California* 1980) separates the genus in the key on the basis of the anther appendages, but correctly omits the appendages in his accompanying species illustration.

Clearly *B. fastigiata* must be returned to the genus *Lippia*, as *L. fastigiata* T. S. Brandegee. One can argue phenetically to retain *Burroughsia* as a monotypic genus based on the character of a distinct filament-like connective extension. Cladistically, however, one sees that the genus is based entirely on a single, apomorphic feature and that its generic segregation cannot be supported. Within *Lippia*, the relationship of taxon *appendiculata* is not entirely clear. It shares a number of vegetative and floral characteristics with *Lippia fastigiata* and may indeed be most closely related to that taxon. In the Verbenaceae the presence of anther connective extensions is not restricted to *B. appendiculata*: similar, though less well defined extensions occur on the distal, abaxial filaments in some species of *Glandularia*. This, however, is hardly a synapomorphic character, because the genera differ in many other basic features.

At the present time I can see no reason to retain *Burroughsia* as a distinct genus based on a single apomorphic character and suggest the two species be returned to *Lippia* as *Lippia appendiculata* Robins. & Greenm., of the Chihuahuan Desert region, and *Lippia fastigiata* T. S. Brandegee of Baja California. Perhaps the time has come to look also into the validity of other generic segregates of *Lippia* such as *Aloysia* A. L. Juss., which is based on the presence of elongate inflorescences, and the low-growing *Phyla* Lour.—JAMES HENRICKSON, Department of Biology, California State University, Los Angeles 90032. (Received 19 Nov 1984; accepted 16 Mar 1985.)

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NEW COMBINATIONS IN CALIFORNIA *Chamaesyce* (EUPHORBIACEAE).—As an additional installment of nomenclatural changes (Hickman, *Madroño* 31:249–252. 1984) for a revision of W. L. Jepson's *Manual* (Jepson, *Man. fl. pls. Calif.* 1925), four new combinations in the genus *Chamaesyce* are made for California taxa. Attention is also drawn to a nomenclatural change in the taxonomy of the genus from that of Wheeler (*Rhodora* 43:97–154, 168–286. 1941).

*Euphorbia* s.l. encompasses a group of plants ranging from small temperate annuals to ten-meter-tall tropical trees. Within this diverse collection, several natural assemblages can be recognized and are variously treated at generic, subgeneric or sectional

levels. The generic delimitation of the tribe Euphorbieae to be followed in the new Jepson's Manual will be that of Webster (Taxon 24:593–601. 1975) in which *Chamaesyce* is segregated from *Euphorbia*.

Koutnik (S. African J. Bot. 3:262–264. 1984) recently reviewed the characteristics distinguishing *Chamaesyce* from *Euphorbia*. Of primary importance is the sympodial growth habit of *Chamaesyce*, which is not found in *Euphorbia*. Although the stem anatomy is not fully understood at present (Rosengarten and Hayden, Virginia J. Sci. 34:142. 1983), sympodial growth arises from the abortion of the apical meristem of the main stem after the first true leaves have formed. Subsequent growth is from lateral branches originating in the region of the cotyledonary nodes. Sympodial growth continues throughout the life of the plant: each terminal bud of a branch aborts and is alternately replaced by a bud from either side of the stem apex. The morphology of this pattern is explained in some detail (Verdus, Bull. Soc. Hist. Nat. Toulouse 99:138–156. 1964). There are no other species in the Euphorbiaceae that display this growth form.

Another feature of *Chamaesyce* not found in *Euphorbia* is the occurrence of the  $C_4$  photosynthetic pathway (Downton, Photosynthetica 9:96–105. 1975). Associated with the  $C_4$  photosynthetic pathway is the Kranz anatomy of large chlorenchymatous cells forming a sheath surrounding the vascular bundle, also displayed by *Chamaesyce* species but not by *Euphorbia*. Additional distinguishing characters of *Chamaesyce* are the typically prostrate to ascending plant habit, the alternate arrangement of stem-branches, the opposite leaves, each with a discernibly asymmetric base, the presence of stipules, the frequent presence of white to pink petaloid appendages on the four (rarely five) involucre glands of the cyathium, and the ecarunculate seeds. All of these characters taken collectively should easily place an unknown specimen in the correct genus.

One important departure from the nomenclature of *Chamaesyce* by Wheeler (1941) is the correct application of *C. maculata* (L.) Small (see Burch, Rhodora 68:155–166. 1966). *Chamaesyce maculata* is the correct name for the common garden weed called “spotted spurge.” This is a prostrate annual plant that is frequently given the name *E. supina* Raf. (e.g., Munz, Calif. fl. 1959; Fl. S. Calif. 1974). The plant described under *C. (E.) maculata* by Munz and Wheeler has ascending branches and is properly identified as *C. nutans* (Lag.) Small.

The following four new combinations complete the generic assignment to *Chamaesyce* for all the currently accepted taxa in California. The subspecific rank is used to indicate geographic unity of the taxon and to maintain uniformity within the existing taxonomy for the California members of *Chamaesyce*.

***Chamaesyce abramsiana*** (Wheeler) Koutnik comb. nov.—*Euphorbia abramsiana* Wheeler, Bull. S. Calif. Acad. Sci. 33:109. 1934.—*Euphorbia pediculifera* Engelm. var. *abramsiana* Ewan in Jeps., Fl. Calif. 2:427. 1936.—TYPE: CA, Imperial Co., Heber, Imperial Valley, Jun 1904, *Abrams* 4097 (DS).

***Chamaesyce hooveri*** (Wheeler) Koutnik comb. nov.—*Euphorbia hooveri* Wheeler, Proc. Biol. Soc. Wash. 53:9. 1940.—TYPE: CA, Tulare Co., Yetttem, 30 Jun 1937, *Hoover* 2583 (GH).

***Chamaesyce ocellata* subsp. *rattanii*** (S. Watson) Koutnik comb. nov.—*Euphorbia rattanii* S. Watson, Proc. Amer. Acad. Arts 20:372. 1885.—*Chamaesyce rattanii* Millsp., Publ. Field Columbian Mus. Bot. Ser. 2:411. 1916.—*Euphorbia ocellata* var. *rattanii* Wheeler, Bull. S. Calif. Acad. Sci. 33:107. 1934.—TYPE: CA, Glenn Co., Stony Cr., Jun 1884, *Rattan* 57 (GH).

***Chamaesyce serpyllifolia* subsp. *hirtula*** (Engelm. ex S. Watson) Koutnik comb. nov.—*Euphorbia hirtula* Engelm. ex S. Watson, Bot. Calif. 2:74. 1880.—*Chamaesyce hirtula* Millsp., Publ. Field Columbian Mus. Bot. Ser. 2:409. 1916.—*Euphorbia serpyllifolia* var. *hirtula* Wheeler, Proc. Biol. Soc. Wash. 53:11. 1940.—TYPE: CA, San Diego Co., Talley's, Cuyamaca Mts., 1875, *Palmer* 451 (GH).

The following is a list of the currently accepted *Chamaesyce* taxa in California:

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| <i>C. abramsiana</i> (Wheeler) Koutnik                                     | <i>C. parishii</i> (Greene) Millsp.  |
| <i>C. albomarginata</i> (Torrey & A. Gray) Small                           | <i>C. parryi</i> (Engelm.) Rydb.   |
| <i>C. arizonica</i> (Engelm.) Arthur                                       | <i>C. pediculifera</i> (Engelm.) Rose & Standley                             |
| <i>C. fendleri</i> (Torrey & A. Gray) Small                                | <i>C. platysperma</i> (Engelm. ex S. Watson) Shinnery                        |
| <i>C. glyptosperma</i> (Engelm.) Small                                     | <i>C. polycarpa</i> (Benth.) Millsp. var. <i>polycarpa</i>                   |
| <i>C. hooveri</i> (Wheeler) Koutnik  | <i>C. polycarpa</i> var. <i>hirtella</i> (Boiss.) Millsp.                    |
| <i>C. maculata</i> (L.) Small  | <i>C. prostrata</i> (Aiton) Small  |
| <i>C. melanadenia</i> (Torrey) Millsp.                                     | <i>C. revoluta</i> (Engelm.) Small   |
| <i>C. micromera</i> (Boiss.) Wootton & Standley                            | <i>C. serpens</i> (H.B.K.) Small   |
| <i>C. nutans</i> (Lag.) Small  | <i>C. serpyllifolia</i> (Pers.) Small subsp. <i>serpyllifolia</i>            |
| <i>C. ocellata</i> (E. M. Durand & Hilgard) Millsp. subsp. <i>ocellata</i> | <i>C. serpyllifolia</i> subsp. <i>hirtula</i> (Engelm. ex S. Watson) Koutnik |
| <i>C. ocellata</i> subsp. <i>arenicola</i> (Parish) Thorne                 | <i>C. setiloba</i> (Engelm. ex Torrey) Millsp.                               |
| <i>C. ocellata</i> subsp. <i>rattanii</i> (S. Watson) Koutnik              | <i>C. vallis-mortae</i> Millsp.  |

I thank the two anonymous reviewers and the editor for their helpful suggestions. — DARYL L. KOUTNIK, Research Assistant, Missouri Botanical Garden, P.O. Box 299, St. Louis, MO 63166. (Received 22 Oct 1984; accepted 19 Apr 1985.)

REDISCOVERY AND REPRODUCTIVE BIOLOGY OF *Pleuropogon oregonus* (POACEAE). — *Pleuropogon oregonus* Chase (Oregon semaphore grass) was first collected in 1886 by W. C. Cusick in Hog Valley, probably near Union, in northern Oregon. In 1901, another collection of *P. oregonus* was made by A. B. Leckenby in Union, Oregon; and in 1936 M. E. Peck found it again, but in swampy ground 25.8 km west of Adel, Lake County, Oregon. Because *P. oregonus* has not been collected for nearly half a century and is reported as extinct or endangered (Smithsonian Rept. to Congress, Serial No. 94-A, 1975; Aysenu and DeFilipps, Endang. Threat. Pl. U.S., Smithsonian Inst. and World Wildlife Fund, Wash., D.C., 1978; Siddall, Chambers and Wagner, Rare, Threat. Endang. Vasc. Pl. Oregon, Oregon Nat. Area Preserves Advisory Committee, 1979; U.S. Fish Wildlife Serv., Fed. Reg. 45(242):82480–82569, 1980), its recollection is worthy of note.

Oregon, Lake Co., ca. 25 km w. of Adel on Hwy. 140, T39S, R22E, Sec. 5 nw.¼ and T38S, R22E, Sec. 32 sw.¼. *J. Kagan 60482* (ORE), 4 Jun 1979. Very probably the same locality where Peck made the last previous collection, 47 years ago.

*Habitat.* Restricted to sluggish water in depressions and sloughs fed by Mud Cr. on both sides of Hwy. 140, on gravelly silt loam or clay. It grows in association with various grasses and sedges, including *Beckmannia syzigachne*, *Deschampsia danthonioides*, *Glyceria borealis*, *Hordeum brachyantherum*, *Poa nevadensis*, *Carex anthrostachya*, *C. nebraskensis*, and *Eleocharis palustris*. The meadow area, including the portion occupied by *P. oregonus*, has been used for years for fall grazing.

*Reproductive biology.* Oregon semaphore grass blooms from early June to late July and fruits from late July to mid-August. Its inflorescence is a simple, erect raceme,